



Office de la Propriété
Intellectuelle
du Canada

Un organisme
d'Industrie Canada

Canadian
Intellectual Property
Office

An agency of
Industry Canada

CA 2312533 C 2003/01/07

(11)(21) **2 312 533**

(12) **BREVET CANADIEN
CANADIAN PATENT**

(53) C

(22) Date de dépôt / filing Date: 2000/07/07

(41) Mise à la disp. pub. / Open to Public Insp.: 2000/12/28

(42) Date de délivrance / Issue Date: 2003/11/11

(43) Phonème / Phonety: 1989/C6/28 (09/140, 5/4) US

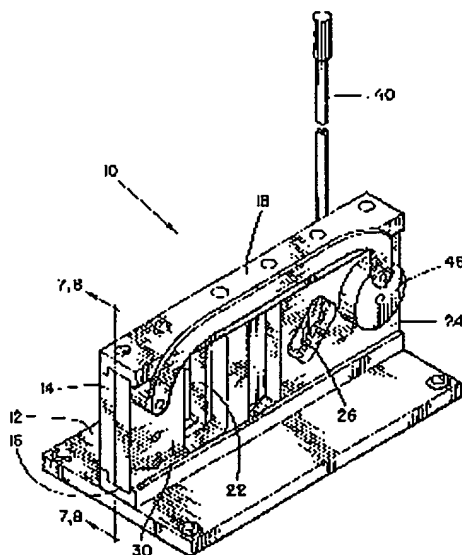
(51) Cl. Int. / Int. Cl.: E23D 15/14

(62) Inventeur / Inventor:
MAROCCO, NORBERT, CA

(63) Propriétaire / Owner:
SHADE-O-MATIC LIMITED, CA

(74) Agent / REK: STON, CH. DICKINSON

(57) Titre: DISPOSITIF DE DECOUPAGE DE STORES VERTICAUX
(54) Title: VERTICAL BLIND CUT DOWN MACHINE AND METHOD



(57) Abrégé / Abstract

A blind cut-down apparatus for cutting a blind having at least a head rail component, and blind material suspended from the head rail, and having a blind component holding plate having at least a head rail opening and a blind material opening for receiving respective components of a blind, and holding them in position for cutting, a blind material cutting bar moveable relative to the holding plate, and carrying material cutting means, for cutting blind material extending through the holding plate, a cutting die support adjacent to the cutting bar, having at least one cutting die for receiving the headrail, and being moveable relative to the holding plate; for cutting at least one the headrail and including a movement device for moving the blind material cutting bar and the cutting die support substantially simultaneously, so as to cut the blind material and the head rail in a common plane.

Canada

<http://cipc.gc.ca> - Ottawa-Hull K1A 0G9 - <http://cipo.gc.ca>

(510) - (330) 101

OPIC



CIPO

BEST AVAILABLE COPY



1
1:4 02312533 2002 05 31

FIELD OF THE INVENTION

The invention relates to a machine for trimming the ends of components of vertical blinds having a horizontal head rail and vertical strips or louvres.

BACKGROUND OF THE INVENTION

Vertical blinds are available in which the head rails are formed of metal, such as steel, usually with trolleys sliding in the head rail and from which vertical slats are suspended. These slats may be of aluminium, or may be formed of other materials such as thermoplastic, or of fabric.

Such blinds must be fitted to the width and to the height, of the window or other
10 opening for which they are intended. In the past such vertical blinds have been made in a factory, on a custom basis to a particular width and height specified by the purchaser. A salesperson would usually have had to call on the customer to take measurements and take an order. However, it is more convenient to manufacture such vertical blinds in certain standard widths and heights and stock these standard blinds in a retail store. A customer may then simply come into the store and buy a blind slightly wider and higher than the desired width and height, and have it trimmed. The head rail is cut to the desired width and in the case of vertical blinds the vertical slats are cut at their lower ends to the desired height. This is both more economical, and thus more readily saleable, and at the same time provides the customer with an opportunity to
20 purchase blinds in a retail establishment and walk out of the store with them in his possession, rather than meeting a salesperson at home, and waiting a few weeks for them to be fabricated in a factory.

In the past various apparatus has been designed for cutting down widths of

10 02312533 2002 05 31

blinds of specific designs, usually horizontal Venetian blinds. However, in general terms, these machines have not been totally suitable for cutting down both horizontal and vertical blinds, especially those made of a variety of different materials. In addition they have been somewhat more complex and costly than is required. In vertical blinds, the trolleys and the blind slats may be drawn along the head rail to one side or the other of the window opening, or in some cases to both sides, and may be rotated between open and closed positions, by a mechanism located in the head rail.

Advantageously, these vertical blinds too would be provided in standard widths and heights, in a retail store and it would be desirable to provide an apparatus in the store for cutting down the width of the head rail and the height of the slats.

It is further advantageous for the cut-down machine to be adaptable to cutting down vertical blinds.

Preferably, in order to economize the in-store installations of blind cut-down equipment and also to simplify instruction of staff, a single cut-down machine will be provided which enables of vertical blinds to be cut down to the desired width and height.

One of the considerations in designing such a cut-down machine is the manual effort that is required to operate the machine to cut through the various different materials.

Clearly, metal such as steel used in the horizontal head rails, is relatively hard to cut. On the other hand, since the sections used in this type of product are relatively thin, the die for cutting the steel components of the blind may only be required to move a short distance.

Consequently, so long as adequate leverage is provided to move the metal

12A 02312533 2002 05 31

cutting die a relatively short distance, this problem can be addressed.

On the other hand, the cutting of the vertical blind slats or louveres themselves presents entirely different problems. The slats are usually made of relatively soft material which is easy to cut, and requires less manual effort. On the other hand, the thickness of all of the blind slats when bundled together for cutting is considerable. Consequently, the means for cutting the blind slats must move a considerable distance.

While it is relatively easy to provide for the manual operation of such a cutting means moving a considerable distance for cutting bundles of blind slats, the problem becomes more complex when it is understood that it is desirable to cut all of the components in a single machine.

It would be possible to provide two machines, one which cuts only the head rail, usually made of steel, and a second machine for an entirely separate cut for cutting the blind slats. However the cost of two machines may not be justified. Personnel must be trained on two machines.

For these reasons therefore the design of a blind cut down machine meeting all of these objectives, i.e. being capable of cutting through both the thicker bundle of blind slats, and the thinner harder head rail in a single manual cutting machine presents a complex problem.

When trimming the blind it is necessary to provide for cutting the complete bundle of vertical blind slats along their lower ends, by cutting all the slat ends along a common plane.

For this purpose it is desirable to provide a form of end stop which is both adjustable to adjust the length of trim cut being cut off the blind components, and which is also

12A 02312533 2002 05 31

moveable during the cutting stroke. This last requirement moves the end stop away from contact with ends of the components, so that as they are cut, the trim portions are free to fall away without obstruction from the end stop.

BRIEF SUMMARY OF THE INVENTION

With a view to providing a vertical blind cut down apparatus which addresses the various foregoing conflicting problems, the invention comprises a vertical blind cut-down apparatus for cutting a shade or a blind, the blind being of the type having at least a head rail component, and vertical window coverings suspended from the head rail, and comprising a blind component holding plate having at least a head rail opening and a
10 blind slot opening formed therein for receiving respective components of a blind there through, and holding them in position for cutting, a blind slot cutting bar moveable relative to said holding plate, and carrying blind slot cutting means, for cutting blind slot material extending through said holding plate, a head rail cutting die support adjacent to said cutting bar, said cutting die support carrying at least one cutting die for receiving said head rail extending there through, and said cutting bar being moveable relative to said holding plate for cutting said blind slot components, and including movement means for moving said blind cutting bar and said cutting die support, whereby both said blind slot material and said head rail may be cut in a common plane along the surface of said holding plate.

20 The invention further provides such an apparatus in which the head rail defines a transverse axis and in which the head rail opening in the holding plate is located and oriented so as to position the axis of said head rail diagonal to the longitudinal axis of the holding plate, and in which the head rail cutting die defines a cutting opening which

1:1 02312533 2002 05 21

is similarly diagonal, the cutting die support means being slidably moveable relative to the holding plate, so that the head rail is cut along a linear axis which is diagonal to the transverse axis of the head rail.

The invention further provides such a cut down apparatus in which the blind cutter bar for the blind cutting means is slidable along a linear cutting path of predetermined length relative to the holder plate, and in the same plane as said cutting die support, said cutter bar being spaced from said cutting die support by a distance at least equal to the length of said cutting path of said cutting means.

10 The invention further provides such an apparatus in which the movement means comprises a rotary shaft mounted in said holder plate, and a cam mounted on said rotary shaft for moving said cutting die support a sufficient distance to sever the head rail, and including movement transmission means connecting between said rotary shaft and said cutter bar, for moving said cutter bar simultaneously with said cutting die support.

The invention further provided end stops positioned to register with the various blind components being trimmed, and which end stops are adjustable to fix the trim length of each component separately, and which end stops are also moveable, during the cutting stroke, so that they move away from the trim portions of the components, as they are being cut so that they are free to fall away and do not remain held in position.

20 The various features of novelty which characterize the invention are pointed out with more particularity in the claims annexed to and forming a part of this disclosure. For a better understanding of the invention, its operating advantages and specific objects attained by its use, reference should be made to the accompanying drawings

US 02312533 2002 05 31

and descriptive matter in which there are illustrated and described preferred embodiments of the invention.

IN THE DRAWINGS

Figure 1 is a perspective of a vertical blind cut down apparatus illustrating the invention;

Figure 2 is a side elevation of the apparatus from the fixed holder plate side;

Figure 3 is a side elevation of the apparatus from the moveable head rail die and cutter bar side;

Figure 4 is a side elevational view showing, in phantom, the length of travel of the head rail cutting die and the blind slot cutter bar respectively and showing in phantom two positions of the manual transmission.

Figure 5 is a section along the line 5-5 of Figure 1;

Figure 6 is a section along the line 6-6 of Figure 1;

Figure 7 is a section along line 7-7 of Figure 1, showing a first position;

Figure 8 is a section along line 8-8 of Figure 1, showing a second position;

Figure 9 is a perspective illustration of a further embodiment of vertical blind cut down apparatus, and,

Figure 10 is a perspective from another angle of the apparatus of Figure 9.

DESCRIPTION OF A SPECIFIC EMBODIMENT

Referring to Fig. 1, it will be seen that the invention is illustrated as an embodiment of an in-line cut down apparatus for trimming vertical blinds, indicated generally as 10.

It comprises of base plate 12, and a fixed component holder plate 14. The component holder plate 14 is secured to a lower channel 16 which is mounted on plate

U.S. 02312533 2002 05 31

12, and an upper channel 18 is secured to the top edge of plate 14.

The holder plate 14 is provided with a head rail holder opening 20, and a blind covering component holder opening 22, (in this case blind slats).

The head rail opening 20 will clearly have to necessarily conform to the shape of the head rail of the particular blind being cut down. However, since the apparatus will normally be provided to the retail outlet by the manufacturer of the blinds, this presents no problem.

In some cases, it is conceivable that interchangeable dies could be provided, but it is believed to be an unnecessary and expensive refinement.

10 A moveable head rail cutting die support plate 24 is slidably mounted between the lower channel 16 and the upper channel 18. The moveable head rail cutting plate 24 has a head rail cutting die opening 26, which has a shape corresponding to the head rail holder opening 20 in fixed plate 14. Movement of the plate 24 will therefore cause movement of the die opening 26 and thereby sever the head rail.

A blind slat cutting bar 30 is slidably mounted between lower channel 16 and upper channel 18. It is provided with a blind slat cutting opening 32, which is preferably provided with some form of blind material cutting means such as knife 34 which is located so as to sweep past the opening 22 in holder plate 14 and thereby cut blind material extending therethrough.

20 As best shown in Fig. 3, there is a space between support 24 and bar 30, for reasons to be described below, so as to permit the two members to travel simultaneously, but along movement paths which are of different lengths from one another.

1: A 02312533 2002 05 31

In order to move both plates simultaneously, there is provided a drive shaft 38, which is rotatably mounted in suitable bearings in fixed plate 14 (Fig. 6). Coupled to the drive shaft 38 is a manually operable lever 40.

Drive shaft 38 terminates within the thickness of moveable plate 24, in an off-set drive cam 42. Drive cam 42 is moveable around an orbit. A drive opening 44 is provided in plate 24 to receive cam 42.

It will thus be seen that by the operation of lever 40, the drive shaft 38 can be rotated. Rotation of the drive shaft 38 will procure orbital movement of the cam 42 within recess 44. The cam 42 is offset from the central axis of the drive shaft 38, by a relatively small radial distance, and therefore drive cam 42 will cause sliding movement of plate 24 along a relatively short distance (compare Figs. 3 and 4).

A boss 46 is mounted on the end of orbital drive cam 42. Drive cam 42, will cause boss 46 to orbit around shaft 38. The boss 46 is connected to a crank arm 48, which is in turn pinned by pin 50 to plate 30.

Thus as the drive cam 42 orbits around a relatively small arcuate path relative to the central axis of drive shaft 38, the outer periphery of boss 46 will orbit around a much greater distance. This greater distance will be coupled through crank arm 48, to plate 30, and plate 30 will thus move simultaneously with movement of plate 24 but over a distance which is substantially greater (compare Figs. 3 and 4).

Reference may be made to the arrow A1, A2 (Fig 4) for a comparison of the two different distances moved by the two separate plates.

It will thus be seen that the invention provides a relatively simple straightforward vertical blind cut down apparatus which is adapted to cut down the head rail and the

1:4 02312533 2002 05 31

blind material of a vertical blind in a single machine. The blind head rail cutting action is achieved over a relatively small distance using considerable leverage. The head rail typically will be of relatively thin metal, or in some cases of only slightly thicker extruded plastic material. Thus a relatively short movement of the cutting die will sever the head rail. The blind material cutting means moves a substantially greater distance, simultaneously with movement of the head rail cutting support.

This movement along the blind slat cutting path will continue after the head rail has been cut, in most cases, depending on the number, and thickness, of the blind slats being cut.

- 10 Thus the manual effort required for cutting the head rail will be completed relatively early in the cutting stroke of the lever, whereas the manual effort of cutting the blind slats will be extended over a greater length of movement of the lever.

Referring now to Figs 9 and 10, a modified form of cut down apparatus is shown, having end stops for presetting the lengths of the components to be trimmed. It will be appreciated that since this machine is a multi-purpose machine, designed for trimming various different types of vertical blinds,

such end stops will be required to register with the various specific components, and may have to be adjusted to different lengths of trim for different components.

- Accordingly, the modified machine is indicated generally as 60 and has a base plate 82, which can be secured to a bench, and component holder plate 64 fixed to base 62 at right angles. Component plate 64 is secured in a lower channel 66, which is mounted on base 82 and an upper channel 68 is secured along the upper edge of plate 64. Holder plate 64 has first head rail opening 20 tilted at an angle, and a second head rail
- 20

10 02312533 2002 05 31

opening 72 which is oriented to lie on a vertical axis. A third head rail opening 74 is provided spaced from second opening 72. The three head rail openings are shaped to conform to and to receive head rails of various different types of vertical blinds or window coverings, which customarily have various different types of head rails, having various different profiles.

Holder plate 64 also has a blind slat or covering component recess 76. The recess 76 is of generally rectangular shape and functions to receive the blind slats or covering materials of the blind or window covering.

The coverings may be wide strips of thicker material in the some vertical blinds.

10 In this case the strips may be formed of plastic, metal, or fabric.

Window coverings are also known in which the covering is a continuous sheet of fabric, pleated and folded in concertina fashion at the pleats, so that the entire piece of fabric, if being trimmed, must be trimmed, along each edge, over its entire length.

Vertical blinds require that the headrail is trimmed to the required width dimension of the window or doorway, for example, and that the vertical strips are trimmed, by a different amount as required by the height of the window or doorway for example.

The actual trim cuts of the head rail are achieved by the cutting die support plate 78 which is slidably supported between lower channel 66 and upper channel 68.

20 Plate 78 has three headrail cutting die openings 80 and 82 and 84 which register with respective head rail openings 70, 72 and 74 in holder plate 64.

A blind slat or covering component cutting plate 86, separate from plate 78 is also slidably mounted in channels 66 and 68. Plate 86 has a cutting opening 88 for cutting the covering components described above. A suitable cutting blade 90 is

1: 02312533 2007 05 31

secured to plate 86 adjacent the opening 88. Both plates 78 and plate 86 are moveable to perform respective cutting strokes.

The two plates 78 and 86 are moveable by handle 92 and an internal drive cam (not shown) similar to the drive cam 42 of the embodiment of Figures 3,4,5 and 6, which drives the plate 78. The plate 86 is driven by boss 94, similar to the boss 46 of the embodiments of Figures 4, 5 and 6. Boss 94 is connected by connection arm 96 as in the previous embodiment to cutting plate 86.

By this means two plates 78 and 86 are moveable simultaneously in response to the single semi rotary movement of the handle 92, but will move along cutting paths which are of different lengths. The cutting path of plate of 78 being relatively short and the cutting path of plate 86 being significantly longer in the same way as shown in Figures 3 and 4.

In order to provide for a stop means or end stop for the head rails and blind materials or blind components being cut down, and end stop plate 100 is provided. Plate 100 is mounted on a vertical post 102. Post 102 is mounted on a transverse slide bar 104. Slide bar 104 is provided a lengthwise slot 106.

Slide bar 104 is moveably secured to a slide block 108 being adjustable relative to block 108 by means of locking screw 110 received in slot 106 as shown. Slide block 108 is mounted on parallel guide rods 112, and is slidable therealong in a manner to be described below.

Mounted on end stop plate 100 is a blind component stop bar 114 having an elongated slot 116 form therein. A clamping rod 118 is received in slot 116 and may be operated by handle 120, so as to clamp stop bar 114 to plate 100. For certain types of blind

12A 02312533 2002 05 31

components, a hinge portion 122 of plate 100 may be hinged on hinge 124 between an upstanding position (not shown) and the horizontal position as shown in Figures 9 and 10. The entire end stop assembly is moveable, in response to cutting movement of handle 92 by means of link 126, (Fig. 10), connected to an end block 128 on component cutting plate 86. This will, through the link 126, move the slide block 108 along guide rods 112, thereby moving the end stops away from the components at the time they are cut.

The purpose of providing for the two means of adjustment namely the slide bar 104 and locking screw 110, and the stop bar 114 and rod 118 is to permit the end stops to be
10 set at different positions, while performing the single cutting operation. This is required because in the case of certain types of window coverings, typically verticals for example, the head rail will be cut down at one end only to fit the width of a door whereas the vertical blind elements or materials will be cut down at their lower ends, to fit the height, and the two trim cut will be of different lengths.

Similar considerations may arise with other types of window covering.

The foregoing is a description of a preferred embodiment of the invention which is given here by way of example only. The invention is not to be taken as limited to any of the specific features as described, but comprehends all such variations thereof as come within the scope of the appended claims.

CA 02312533 2002-07-23

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A vertical blind cut-down apparatus for trim cutting a vertical blind having a horizontal head rail defining two ends, and vertical blind materials defining upper and lower ends suspended by said upper ends from the head rail, and comprising:
 - a head rail holding plate having a head rail opening formed therein for receiving said head rail therethrough;
 - a head rail cutting die and head rail die support for cutting said head rail adapted to receive said head rail extending there through, and being moveable relative to said head rail holding plate for cutting one end of said head rail;
 - a blind material holder having a blind material opening therethrough for receiving said vertical blind materials therein;
 - a blind material cutting device moveable relative to said blind material holder for cutting blind material extending through said blind material holder, and, movement transmission for moving said head rail cutting die and movement transmission for moving said blind material cutting device whereby both said vertical blind materials and said horizontal head rail are cut.
2. A vertical blind cut down apparatus as claimed in Claim 1 wherein the head rail defines a transverse axis and in which the head rail opening in the holding plate is located and oriented so as to position the axis of said head rail diagonal to the longitudinal axis of the holding plate, and in which the head rail cutting die

1:1A 02312533 2002 05 31

defines a cutting opening which is similarly diagonal, the cutting die support being slidably moveable relative to the holding plate, so that the head rail is cut along a linear axis which is diagonal to the transverse axis of the head rail.

- 10 3. A vertical blind cut down apparatus as claimed in Claim 2 wherein the blind cutting device is also slidable along a linear cutting path relative to the holder plate, and in the same plane as said cutting die support, said cutting device being spaced from said cutting die support by a distance at least equal to the cutting path of said blind cutting device.
- 20 4. A vertical blind cut down apparatus as claimed in Claim 2 wherein said movement transmission comprises a rotary shaft mounted in said holder plate, and a cam mounted on said rotary shaft for moving said cutting die support a sufficient distance to sever the head rail, and including movement transmission link connecting between said rotary shaft and said blind cutting device, for moving said cutting device simultaneously with said cutting die support.
5. A vertical blind cut down apparatus as claimed in Claim 1 and including a base plate, a lower slide channel fixed to said base plate, and said head rail holding plate and said blind holder being secured to said lower guide channel, and

1:4 02312533 2002 05 31

further including an upper guide channel secured to the upper side of said holding plate.

6. A vertical blind cut down apparatus as claimed in Claim 5 and wherein said blind cutting device is slidably received in said lower and upper guide channels and wherein said head rail cutting die is also slidably received in said lower and upper guide channels, said cutting device and said cutting die thereby sliding in a common plane and being separate from one another.
- 10 7. A vertical blind cut down apparatus as claimed in Claim 4 and wherein said rotary shaft carries a cam, mounted on said shaft and said cam being received in a opening formed in said cutting die, for moving said cutting die along a cutting die movement path, and including link arm means connecting said rotary shaft to said blind cutting device, for moving said cutting device through a blind cutting movement path, said blind cutting movement path being longer than said cutter die movement path.
- 20 8. A vertical blind cut down apparatus as claimed in Claim 7 and including an end stop member mounted adjacent to and spaced from said cutting die and said blind cutting device.
9. A vertical blind cut down apparatus as claimed in Claim 7 and wherein said cam

U.S. PATENT AND TRADEMARK OFFICE

is located on an axis of said shaft which is offset from a rotary axis of said shaft and wherein a boss is mounted on said cam, for orbital movement, and wherein said link arm is connected to said boss.

10. A vertical blind cut down apparatus as claimed in Claim 8 and including a first end stop means for registering with said head rail cutting die, and second end stop means registering with said blind cutting device, and first adjustment means for adjusting the spacing between said first end stop and said head rail cutting die, and second adjustment means for adjusting the spacing between said second end stop and said blind cutting device.
11. A vertical blind cut down apparatus as claimed in Claim 10 and including linkage connected between said blind cutting device and said end stop means, for moving said end stop means away from said cutting die and said blind cutter device, upon movement of said movement transmission to procure a cutting stroke.
12. A method of trimming components a vertical blind having a horizontal head rail defining a first fixed end and a second trim end and vertical blind materials defining upper attachment ends and lower trim ends and said upper ends being adapted to be attached to and suspended from said head rail, and comprising the steps of:
passing said trim end of said head rail through a holding plate having a head rail

1: A 02312533 2002 05 31

opening;

passing said trim end of said head rail through a head rail cutting die, said head rail cutting die being movable relative to said holding plate;

moving said head rail cutting die relative to said holding plate for cutting said trim end of said head rail extending through said holding plate, whereby to cut said trim end of said head rail, while leaving said fixed end untrimmed;

passing said lower trim ends of said blind materials through a blind holder having a blind material opening;

10 passing lower trim ends of said blind materials into registration with a blind materials cutting device, said blind materials cutting device being movable relative to said holder; and,

moving said blind materials cutting device relative to said holder for cutting said trim ends of said blind materials extending through said holder, whereby to cut said lower trim end of said blind materials while leaving said upper attachment ends untrimmed.

13. A method of trimming components a vertical blind as claimed in claim 12 and including the steps of moving said head rail cutting die a first distance for cutting said head rail, and simultaneously moving said blind cutting device through a
20 second distance, greater than said first distance for cutting said blind materials.

14. A method of trimming components a vertical blind as claimed in claim 13 and including the step of passing said trim end of said head rail through said cutting

1:1 02312533 2002 05 31

die a first predetermined trim distance, and passing said blind materials through said blind holder a second predetermined trim distance wherein said first trim distance is different from said second trim distance.

15. A method of trimming components a vertical blind as claimed in claim 14 and including the step of moving said cutting die by rotary movement of a cam drive relative thereto, and moving said blind cutting device through linkage connected to said cam drive.

10

20

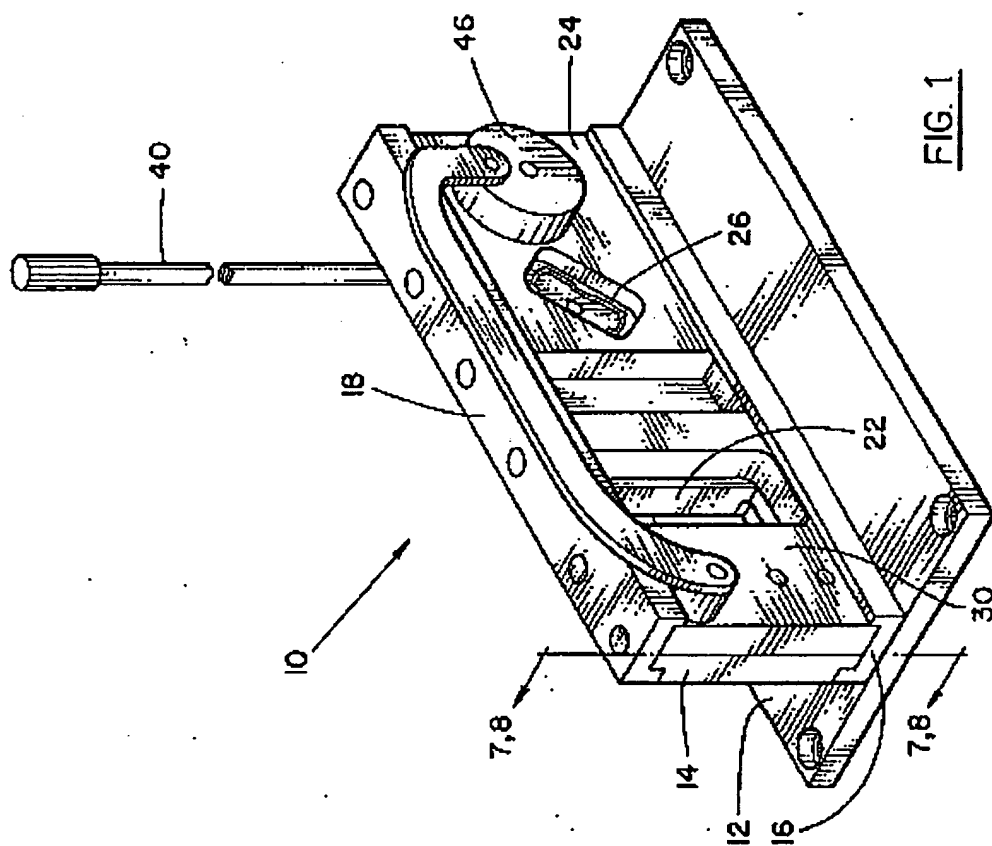
18

CA 02312533 2000-06-27

ABSTRACT OF THE DISCLOSURE

A blind cut-down apparatus for cutting a blind having at least a head rail component, and blind material suspended from the head rail, and having a blind component holding plate having at least a head rail opening and a blind material opening for receiving respective components of a blind, and holding them in position for cutting, a blind material cutting bar moveable relative to the holding plate, and carrying material cutting means, for cutting blind material extending through the holding plate, a cutting die support adjacent to the cutting bar, 10 having at least one cutting die for receiving the headrail, and being moveable relative to the holding plate for cutting at least one the headrail and including a movement device for moving the blind material cutting bar and the cutting die support substantially simultaneously, so as to cut the blind material and the head rail in a common plane.

CA 02312533 2000-06-27



CA 02312533 2000-06-27

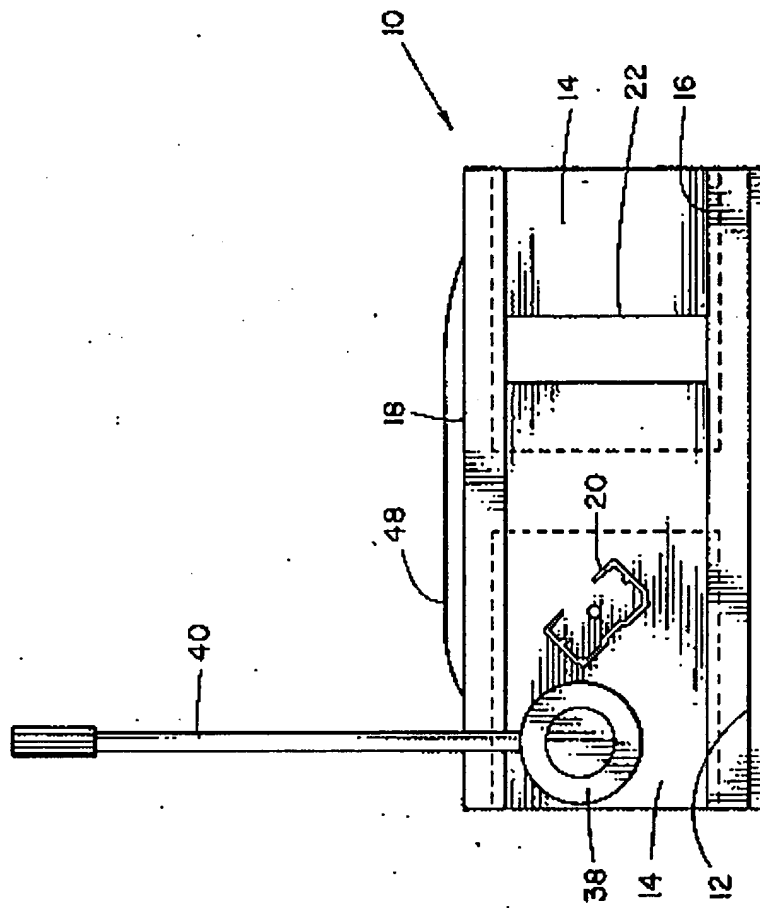


FIG. 2

CA 02312533 2000-06-27

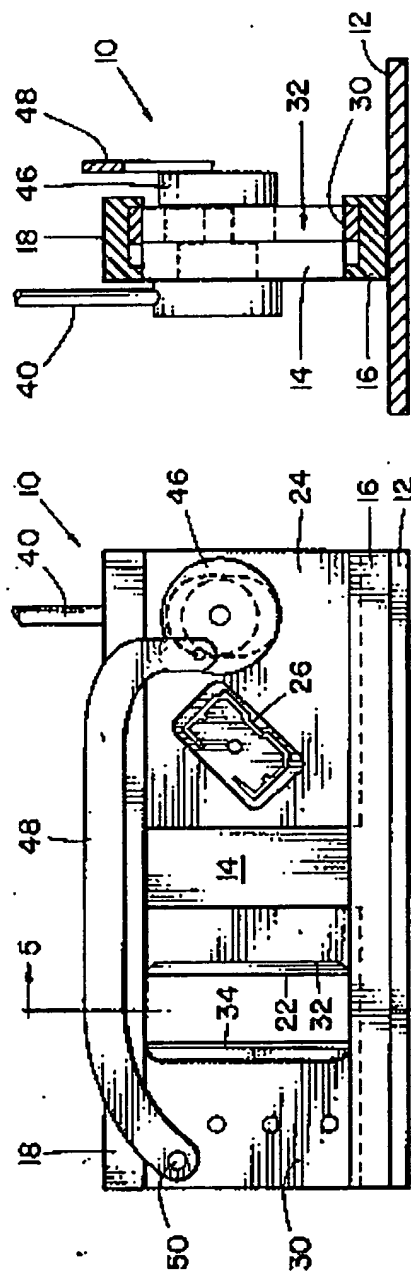


FIG. 3

FIG. 5

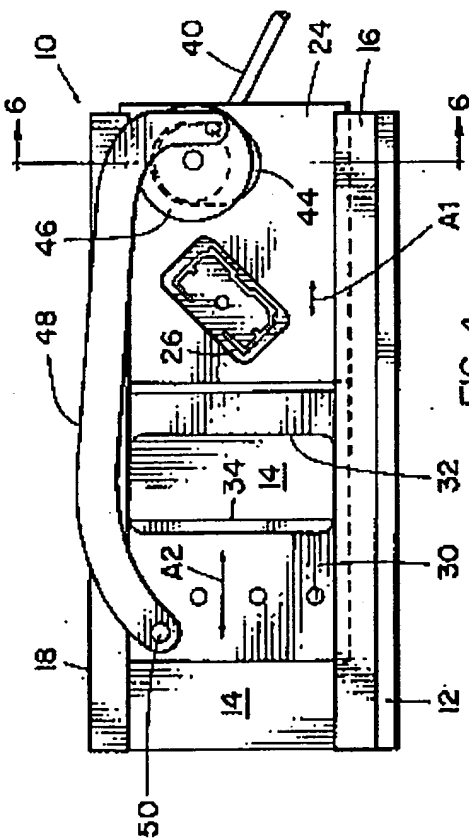


FIG. 4

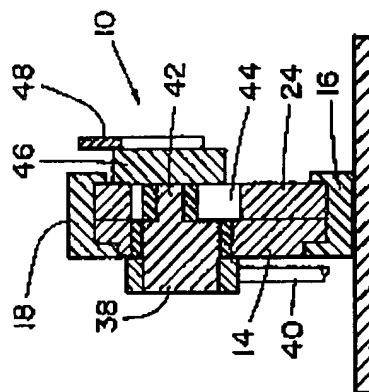


FIG. 6

CA 02312533 2000-06-27

FIG. 7

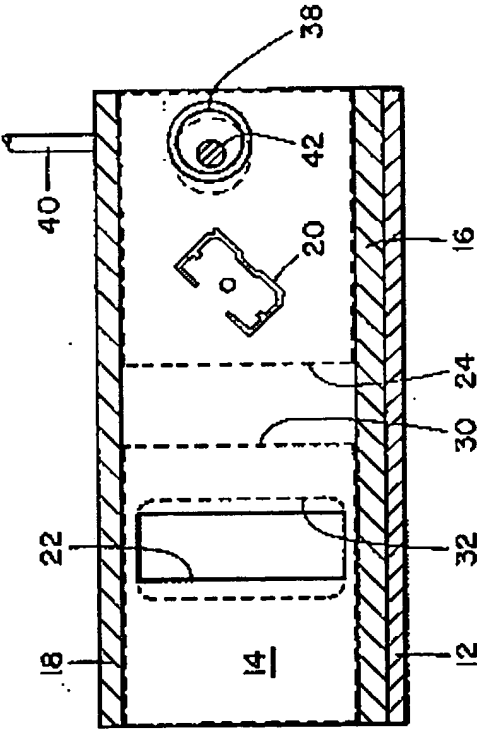
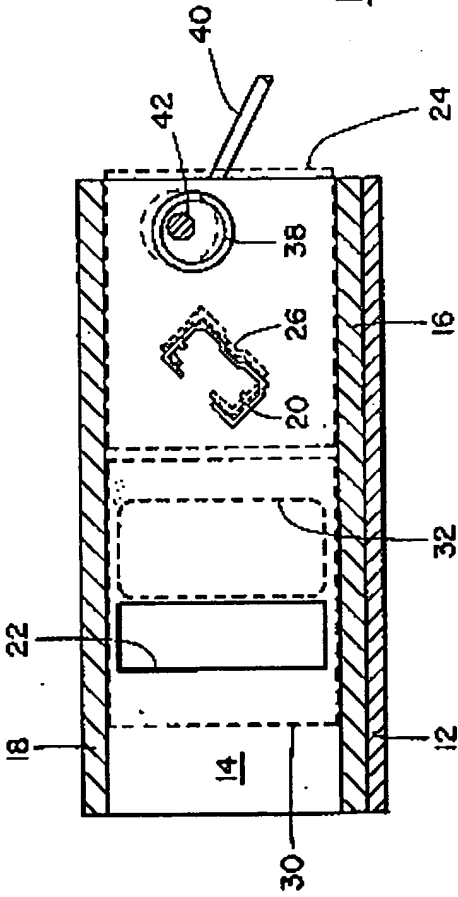
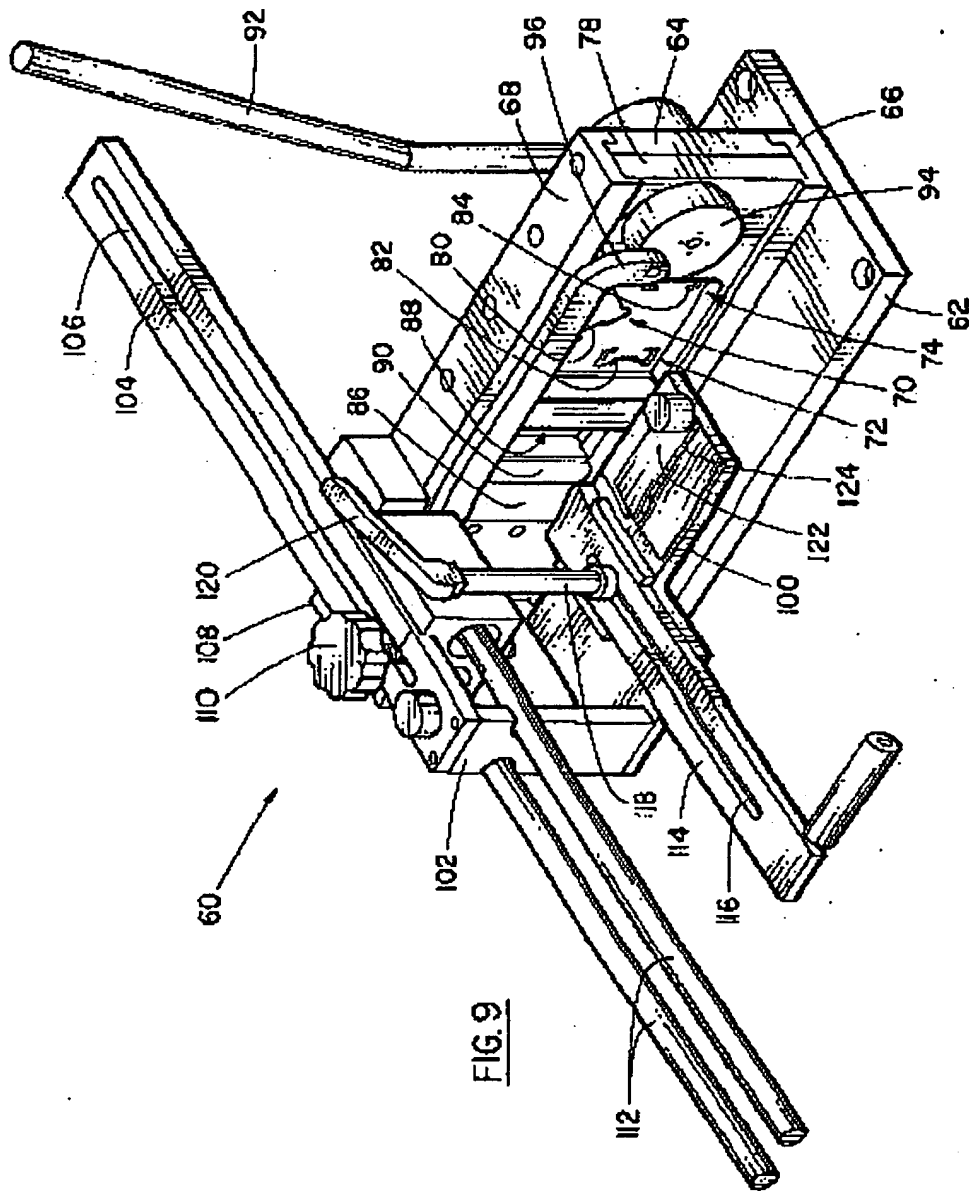


FIG. 8

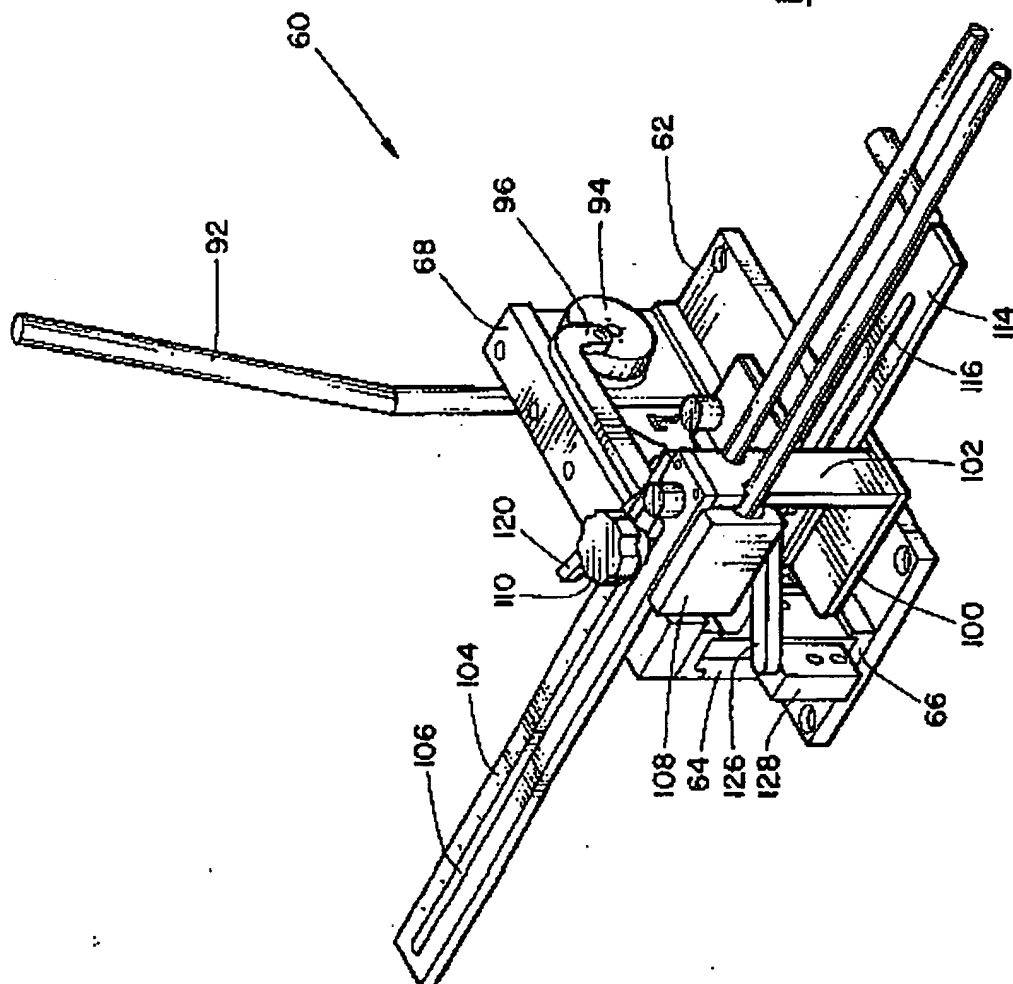


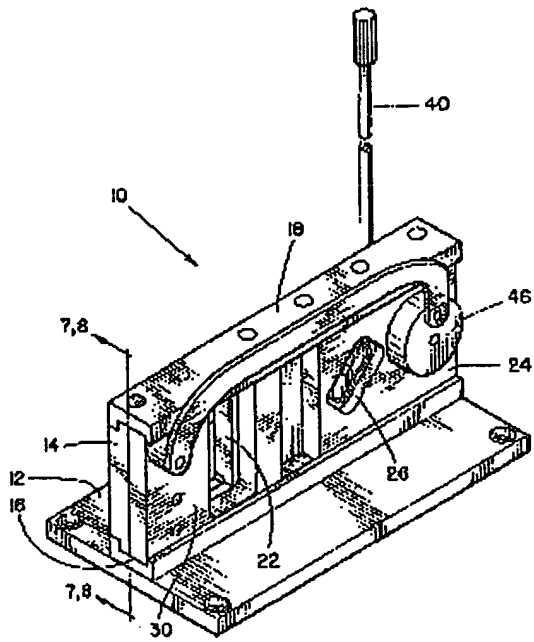
CA 02312533 2000-06-27



CA 02312533 2000-06-27

FIG. 10





**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☒ **BLACK BORDERS**
- ☐ **IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- ☒ **FADED TEXT OR DRAWING**
- ☐ **BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- ☐ **SKEWED/SLANTED IMAGES**
- ☐ **COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- ☐ **GRAY SCALE DOCUMENTS**
- ☐ **LINES OR MARKS ON ORIGINAL DOCUMENT**
- ☐ **REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- ☐ **OTHER:** _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.